

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HARUHIKO YAMAMOTO, HIDEAKI SETO,
NOBUYOSHI SATO, and KYOKO KUROKI

Appeal No. 2006-1202
Application No. 10/020,764

ON BRIEF



Before HAIRSTON, JERRY SMITH, and SAADAT, Administrative Patent Judges.

JERRY SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the examiner's rejection of claims 1-4 and 7-19, which constitute all the claims pending in this application.

The disclosed invention pertains to forming a feature and identifying indicia in a substrate with a shape that aids in removing residue that collects therein. Specifically, the feature is formed with a sidewall forming a void in the substrate where the sidewall comprises both upper and lower portions. The

angle of the upper sidewall is shallower than the lower sidewall angle. Such a structure is more easily cleaned via rinsing, etching, or other cleaning procedures than standard features with steeper sidewalls.

Representative claim 1 is reproduced as follows:

1. A method for forming a feature in a substrate, where residue within the feature can be easily removed, the method comprising the steps of:

forming an upper sidewall portion of the feature by laser ablation, the upper sidewall portion forming a void in the substrate, where the upper sidewall portion has an upper sidewall angle, and

forming a lower sidewall portion of the feature by laser ablation, the lower sidewall portion forming a void in the substrate, where the lower sidewall portion has a lower sidewall angle,

where the upper sidewall angle of the upper sidewall portion is shallower than the lower sidewall angle of the lower sidewall portion.

The examiner relies on the following references:

Woolhouse et al. (Woolhouse)	4,237,601	Dec. 9, 1980
Patel et al. (Patel)	6,642,477	Nov. 4, 2003 (filed Oct. 23, 2001)

The following rejection is on appeal before us:

Claims 1-4 and 7-19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Woolhouse in view of Patel.

Rather than repeat the arguments of appellants or the examiner, we make reference to the briefs¹ and the answer for the respective details thereof.

OPINION

We have carefully considered the subject matter on appeal, the rejection advanced by the examiner and the evidence of obviousness relied upon by the examiner as support for the rejection. We have, likewise, reviewed and taken into consideration, in reaching our decision, appellants' arguments set forth in the briefs along with the examiner's rationale in support of the rejection and arguments in rebuttal set forth in the examiner's answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 1-4, 7-11, and 14-18. We reach the opposite conclusion, however, with respect to claims 12, 13, and 19. Accordingly, we affirm-in-part.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148

¹ An appeal brief was filed Sept. 20, 2004 in response to the examiner's non-final rejection mailed Jun. 22, 2004. In response to a notice of non-compliance, appellants filed an updated appeal brief on May 25, 2005. A reply brief was also filed on Aug. 25, 2005. Because the reply brief incorporates the entirety of the updated appeal brief [see reply brief, page 3], we refer to the reply brief exclusively in this opinion.

USPQ 459, 467 (1966). The examiner must articulate reasons for the examiner's decision. In re Lee, 277 F.3d 1338, 1342, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002). In particular, the examiner must show that there is a teaching, motivation, or suggestion of a motivation to combine references relied on as evidence of obviousness. Id. at 1343. The examiner cannot simply reach conclusions based on the examiner's own understanding or experience - or on his or her assessment of what would be basic knowledge or common sense. Rather, the examiner must point to some concrete evidence in the record in support of these findings. In re Zurko, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001). Thus the examiner must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the examiner's conclusion. However, a suggestion, teaching, or motivation to combine the relevant prior art teachings does not have to be found explicitly in the prior art, as the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references. The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. In re Kahn, 441 F.3d 977, 987-88, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) citing In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313 (Fed. Cir. 2000). See also In re Thrift, 298 F.3d 1357, 1363, 63 USPQ2d 2002, 2008 (Fed. Cir. 2002). These showings by the examiner are an essential part of

complying with the burden of presenting a *prima facie* case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant to overcome the *prima facie* case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See Id.; In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976). Only those arguments actually made by appellants have been considered in this decision. Arguments which appellants could have made but chose not to make in the brief have not been considered and are deemed to be waived [see 37 CFR § 41.37(c)(1)(vii)(2004)].

Regarding the independent claims, the examiner's rejection essentially finds that Woolhouse teaches every claimed feature except for forming the upper and lower sidewall portions by laser ablation [answer, pages 3, 4, and 7]. The examiner cites Patel as teaching forming a through-hole in a substrate by laser ablation. The examiner finds that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Woolhouse's sidewall shaping technique to utilize laser ablation "to provide a desired shape of the hole in the substrate" and provide an alternative method of forming a V-groove [answer, pages 4, 5, and 7].

Appellants argue that in Woolhouse, layers 18 and 19 remain intact over portions of the etched V-groove; therefore, it would be impossible to laser ablate those portions of the groove that are outside of the laser's attainable angle [reply brief, page 5]. Appellants further argue that at least layer 18 must be in place prior to etching because it helps define the desired shape of the etched groove due to the layer's resistance to attack by the etchant [reply brief, page 3]. The examiner responds that, despite the presence of layers 18 and 19, Woolhouse's V-groove could nevertheless be laser ablated before depositing layers 18 and 19 thereover [answer, page 7].

We will not sustain the examiner's rejection of independent claims 1 and 14. We agree with the appellants that at least layer 18 in part helps define the shape of the V-groove during etching. As shown in Fig. 2a of Woolhouse, a channel that is 1-4 mils deep is formed initially by a diamond circular saw blade. Then, V-grooves are etched into the bottoms of the channels with an anisotropic etchant as shown in Fig. 2b [see Woolhouse, col. 4, lines 15-41]. Because the overlying layers 18 and 19 actually assist in defining the shape of the groove itself during and after etching, we see no reasonable way that the groove's sidewalls could be formed by a laser under these conditions. We agree with appellants that it would be impossible to laser ablate those sidewall portions in Woolhouse that are outside of the laser's attainable angle.

Although the examiner speculates that layers 18 and 19 could be formed over the groove after laser ablation, we find no reasonable teaching or

suggestion on this record for such a technique apart from the examiner's conclusory statements. Furthermore, layer 18 in Woolhouse is 0.18-0.28 μm thick and evaporated onto the bottom of substrate 10. Layer 19 is 2-3 μm thick and electroplated through a photoresist mask [Woolhouse, col. 3, lines 48-53]. Even assuming that the layers 18 and 19 were somehow applied after laser ablating the groove, the examiner has provided absolutely no evidence on this record how the skilled artisan could cantilever the evaporated layer 18 that is at most only 0.28 μm thick over the groove as shown in Fig. 2b. Core factual findings in patentability determinations must point to some concrete evidence in the record to support the findings. In re Zurko, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001). In addition, obviousness rejections must be based on evidence comprehended by 35 U.S.C. § 103. In re Lee, 277 F.3d 1338, 1342, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002) (emphasis added). See also In re Kahn, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.").

Turning to the prior art, Woolhouse first cuts through the previously-formed layers 18, 19 and then partially through substrate 10 as a precursor to etching the angled sidewalls. By being resistant to the etchant, layer 18 forms the upper bound of the groove during etching. As best seen in Figs. 1a, 1b, and 2b, layer 18 along with the sidewalls ultimately forms the groove's shape. In

short, suggesting that the layers 18 and 19 could somehow be formed after forming the groove in Woolhouse not only is not fairly suggested by the prior art of record, it actually runs counter to Woolhouse's method. Although we cannot say that no prior art exists that would support the examiner's argument, we can say that insufficient evidence exists on this record to maintain a prima facie case of obviousness of independent claims 1 and 14. The rejection is therefore reversed.

Since we do not sustain the examiner's rejection of independent claims 1 and 14, we likewise do not sustain the examiner's rejection of dependent claims 2-4, 7-11, and 15-18.

We reach an opposite conclusion, however, with respect to independent claims 12, 13, and 19.² Independent claims 13 and 19 recite integrated circuits with features and indicia formed by the methods recited in independent claims 1 and 14 respectively. Claim 12 recites a feature formed by the method recited in claim 1. These claims are product-by-process claims.

It is well settled that reciting how a product is made does not further limit the structure of the product itself. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the

² Appellants incorrectly characterize claims 12, 13, and 19 as dependent claims [see reply brief, pages 8 and 11]. Rather, these claims are independent claims reciting a different category of subject matter, namely products formed by the processes recited in independent claims 1 and 14.

prior product was made by a different process." In re Thorpe, 777 F.2d 695, 697, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted). See also SmithKline Beecham Corp. v. Apotex Corp., 439 F.3d 1312, 1317, 78 USPQ2d 1097, 1100 (Fed. Cir. 2006) ("Regardless of how broadly or narrowly one construes a product-by-process claim, it is clear that such claims are always to a product, not a process. It has long been established that one cannot avoid anticipation by an earlier product disclosure by claiming the same product more narrowly, that is, by claiming the product as produced by a particular process.").

Regarding claims 12 and 13, appellants argue that the Woolhouse/Patel combination does not describe features that are formed by laser ablation and such features have a "far different physical appearance" from features in the cited prior art. We disagree. As noted above, the patentability of a product does not depend on its method of production. We find no structural distinction between the groove (i.e., "feature") 22 of Woolhouse formed by etching as compared to a groove formed by the laser ablation process of claim 1.

Nor have appellants provided sufficient evidence on this record establishing a nonobvious structural difference between the feature claimed in claims 12 and 13 from that disclosed in Woolhouse. "Where a product-by-process claim is rejected over a prior art product that appears to be identical, although produced by a different process, the burden is upon the applicants to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product." In re Marosi, 710 F.2d 799, 803, 218

USPQ 289, 292-93 (Fed. Cir. 1983). See also MPEP § 2113. Appellants' mere assertion that the claimed features have a "far different physical appearance" from the prior art groove is hardly sufficient factual evidence required to overcome the examiner's prima facie case of obviousness. Because the examiner's prima facie case of obviousness has not been rebutted, we will sustain the examiner's rejection of claims 12 and 13.

Likewise, we will sustain the examiner's rejection of claim 19 for essentially the same reasons. We add, however, that the examiner's interpretation of "indicia" as corresponding to Woolhouse's groove 22 on pages 4-6 of the answer is reasonable given the term its broadest reasonable interpretation. Although Woolhouse's groove is formed for an entirely different reason -- namely to assist in cleaving the wafer -- the groove nonetheless reasonably reads on "identifying indicia" as claimed given the scope and breadth of the limitation.

In summary, we have not sustained the examiner's rejection with respect to claims 1-4, 7-11, and 14-18 on appeal. We have, however, sustained the examiner's rejection with respect to claims 12, 13, and 19. Therefore, the decision of the examiner rejecting claims 1-4 and 7-19 is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv).

AFFIRMED-IN-PART


KENNETH W. HAIRSTON
Administrative Patent Judge


JERRY SMITH
Administrative Patent Judge


MASHID D. SAADAT
Administrative Patent Judge

BOARD OF PATENT
APPEALS AND
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